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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/613,083	07/07/2003	Jung-Ching Ko	3226/19	6987

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EXAMINER	
ALEXANDER, MICHAEL P	

ART UNIT	PAPER NUMBER
1742	

DATE MAILED: 08/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/613,083	KO, JUNG-CHING	
	Examiner	Art Unit	
	Michael P. Alexander	1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 June 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) *1-7* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Examiner's Interpretation of the Claimed Invention

The specification states (page 2 lines 2-10) that prior art dipper buckets suffered from a disadvantage that the teeth were too short and that an increase in length was not possible due to insufficient structural strength. The specification then states (page 5 line 25 – page 5) that invention creates a tooth having a strengthened joining portion with improved ductility, thereby making it possible to increase the length of the sharp portion without worrying about breakage. Therefore, the Examiner understands the invention as being a metallurgical process necessary for creating the improved tooth.

The Examiner interprets the metallurgical process as (a) cooling to an austenitizing temperature, (b) quenching in a liquid to form a hardened structure, (c) heating the entire tooth to temper the microstructure, (d) air cooling to avoid thermally induced stresses, and (e) selectively annealing the joining portion of the tooth in a liquid to increase ductility in the joining portion.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rao (U.S. Pat. 5,129,966) in view of: Mitchell (U.S. Pat. 1,552,867); the ASM Handbook, Volume 4; and the admission of prior art in the specification of the instant application (Fig.3).

Regarding claim 1, Rao discloses (col. 1 lines 32-33, col. 6 lines 48-65) a process of manufacturing a tooth of a dipper bucket, the process comprising the steps of: heating to an austenitizing temperature of 900-1100 degrees C, rapidly quenching to room temperature, and tempering at 190-230 degrees C. This would be cooling the tooth at a first temperature, suddenly cooling the tooth in a quenching liquid, and heating the tooth at a second temperature. Rao do not specify that the tooth would have a larger joining portion coupled to the dipper bucket and a sharp portion. Rao also do not specify air cooling after tempering. Rao further do not specify a selective annealing step of supporting the tooth with the joining portion immersed in a fluid and the sharp portion exposed in the air. Rao additionally do not specify that the first and second cooling steps and the selective annealing step would take place in the furnace and do not disclose that the quenching liquid would be the same as the fluid used in the selective annealing step.

With respect to the tooth having a larger joining portion coupled to the dipper bucket and a sharp portion in claim 1, applicant admits as prior art in Fig.3 a tooth

having a larger portion coupled to the dipper bucket and a sharp portion. Rao discloses (col. 6 lines 48-56) that the method is applied in order to achieve hardness and toughness. It would have been obvious to one of ordinary skill in the art to combine the method of Rao to the tooth of the admitted prior art in order to achieve hardness and toughness as taught by Rao.

With respect to air cooling after tempering in claim 1, the ASM Handbook (Vol. 4 pages 76-78) discloses that severely fast cooling can produce distortion and cracking. Therefore, it would have been obvious to one of ordinary skill in the art to modify the heat treating method of Rao by air cooling after tempering in order to avoid distortion and cracking as taught by the ASM Handbook, Volume 4.

With respect to a selective annealing step of supporting the tooth with the joining portion immersed in a fluid and the sharp portion exposed in the air in claim 1, Mitchell discloses (Fig. 5 and col. 1 lines 89-110) supporting a steel member with the joining portion immersed in a fluid and the sharp portion exposed in the air in order to remove some of the temper or hardness already imparted thereto. It would have been obvious to one of ordinary skill in the art at the time of the claimed invention to modify the method of Rao by supporting the steel member with the joining portion immersed in a fluid and the sharp portion exposed in the air in order to remove some of the temper or hardness already imparted thereto.

With respect to the first and second cooling steps and the selective annealing step taking place in the furnace and the quenching liquid being the same as the fluid used in the selective annealing in claim 1, the purpose of the invention as stated in the

specification of the instant application (page 5 line 25 – page 6 line 3) is to improve the ductility of the joining portion of the tooth in order to be able to increase the length of the tooth without breaking the tooth while in operation. Since the purpose of the method is to have a metallurgical effect on the tooth, the Examiner asserts that first and second cooling steps and annealing steps taking place inside or outside the furnace would be functional equivalents. The Examiner further asserts that the quenching liquid being different than the fluid used in the selective annealing would be functionally equivalent to using the same fluid for both steps.

Regarding claim 2, Rao do not specify the use of an electric furnace. However, the ASM Handbook, Volume 4 discloses (page 471-472) that electric furnaces are commonly used because they are clean and free of the pollution normally found with fuel-fired systems. It would have been obvious to one of ordinary skill in the art to modify the heat treating process of Rao by using an electric furnace because it is clean and free of the pollution normally found with fuel-fired systems as taught by the ASM Handbook, Volume 4.

Regarding claim 3, Rao discloses (col. 6 lines 48-56) that the first temperature would preferably be about 900 to 1100 degrees C, which includes the claimed temperature of 920 degrees C. It has been held when a claimed range overlaps or lies within that disclosed by the prior art that a prima facie case of obviousness exists. See MPEP 2144.05 I. It would have been obvious to one of ordinary skill in the art at the time of the claimed invention to select the desired temperature from the range of

temperatures as disclosed by Rao because Rao disclosed the same utility throughout the claimed range.

Regarding claim 4, Rao do not specify that the fluid would be oily. However, the ASM Handbook, Volume 4 discloses (page 125) the use of oil for tempering in order to temper for a long exposure. It would have been obvious to one of ordinary skill in the art at the time of the claimed invention to modify the heat treatment process of Rao by using oil for tempering in order to temper for a long exposure as taught by the ASM Handbook, Volume 4.

Regarding claim 5, Rao do not specify that the first tempering temperature would be about 460 degrees C. However, the ASM Handbook, Volume 4 discloses (pages 121-123) discloses tempering temperatures of from 210-650 degrees C and shows how the tempering temperature determines hardness, strength, toughness and ductility. Since tempering temperature is a result-effective variable as taught by the ASM Handbook, Volume 4, it would have been obvious to one of ordinary skill in the art at the time of the claimed invention to temper at a temperature of about 460 degrees C as a routine optimization. See MPEP 2144.05 II.

Regarding claim 6, Rao do not specify that the fluid at the bottom of the furnace would have a temperature of about 560 degrees C and that the fluid at its surface would have a temperature of about 460 degrees C. As in claim 5 above, the ASM Handbook, Volume 4 discloses (pages 121-123) the effect of tempering temperatures, which would be the temperature of the fluid in the claimed invention, on the hardness, strength, toughness and ductility of the treated object. The claimed limitation of the temperature

of the fluid at the bottom of the furnace having a temperature of 560 degrees and the fluid at the surface having a temperature of 460 degrees seems to be directed toward the unclaimed apparatus and not the "process of manufacturing a tooth". The Examiner asserts that this would have no apparent or disclosed effect on the process and therefore would be functionally equivalent to the heat treatment process of Rao.

Regarding claim 7, Rao discloses (col. 6 lines 48-56) that the method produces a desired hardness in the steel member. The Examiner asserts that the hardness would be from about 46 to about 48 as expressed in HRC. Mitchell discloses (col. 2 lines 108-110) that the method reduces hardness in the annealed portion. The Examiner asserts that the hardness would be from about 35 to about 46 as expressed in HRC.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael P. Alexander whose telephone number is 571-272-8558. The examiner can normally be reached on M-F 8:30-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V. King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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